UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
Northwest Region
7600 Sand Point Way N.E., Bldg. 1
Seattle, WA 98115

Refer to:
2002/00596

August 26, 2002

Mr. Fred P. Patron
Senior Transportation Planning Engineer
Federal Highway Administration, Oregon Division
530 Center Street NE
Salem, OR 97301

Re: Endangered Species Act Section 7 Formal Consultation and Magnuson-Stevens Act Essential Fish Habitat Consultation, Rock Creek to Richey Road Project, Clackamas County, Oregon.

Dear Mr. Patron:

Enclosed is a biological opinion (Opinion) prepared by the National Marine Fisheries Service (NOAA Fisheries) pursuant to section 7 of the Endangered Species Act (ESA) for the Rock Creek to Richey Road Project, along Highway 212, between the cities of Clackamas and Boring, Clackamas County, Oregon. NOAA Fisheries concludes in this Opinion that the proposed action is not likely to jeopardize Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) and Upper Willamette River (UWR) chinook salmon (*O. tshawytscha*). Pursuant to section 7 of the ESA, NOAA Fisheries has included reasonable and prudent measures with non-discretionary terms and conditions that NOAA Fisheries believes are necessary and appropriate to minimize the potential for incidental take associated with this project. This Opinion also serves as consultation on essential fish habitat pursuant to section 305(b) of the Magnuson-Stevens Fishery Conservation and Management Act and its implementing regulations (50 CFR Part 600).

Questions regarding this letter should be directed to Art Martin of my staff in the Oregon Habitat Branch at 503.231.6848.

Sincerely,

for Michael R Course

D. Robert Lohn
Regional Administrator

cc: Molly Cary, ODOT
Tom Murtagh, ODFW
Diana Hwang, USFWS

Endangered Species Act - Section 7 Consultation
&
Magnuson-Stevens Act Essential Fish Habitat Consultation

BIOLOGICAL OPINION

Rock Creek to Richey Road Project,
Clackamas River Watershed,
Clackamas County, Oregon

Agency:	Federal Highway Administration
Consultation Conducted By:	NOAA Fisheries, Northwest Region
Date Issued:	August 26, 2002
Issued by:	F.r Michael R Crouse D. Robert Lohn Regional Administrator
Refer to:	**2002/00596**

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1. ENDANGERED SPECIES ACT

1.1 Background

On June 10, 2002, the National Marine Fisheries Service (NOAA Fisheries) received a letter from the Federal Highway Administration (FHWA) requesting formal consultation on the Rock Creek to Richey Road Project, Clackamas River watershed, Clackamas County, Oregon. The proposed action will be partially funded by the FHWA with Federal dollars and thus constitutes a Federal nexus. The Oregon Department of Transportation (ODOT) is the project applicant.

In the June 10, 2002, letter and the accompanying biological assessment (BA), the FHWA requested formal consultation for Lower Columbia River (LCR) steelhead (*Oncorhynchus mykiss*) and Upper Willamette River chinook salmon (*O. tshawytscha*). The FHWA has determined that listed evolutionarily significant units (ESU) of Columbia Basin salmonids may occur within the project area, and that the proposed projects are "likely to adversely affect" (LAA) these species.

The objective of this consultation is to determine whether the proposed action is likely to jeopardize the continued existence of LCR steelhead or UWR chinook salmon. LCR steelhead were listed as threatened on March 19, 1998 (63 FR 13347), and protective regulations issued on July 10, 2000 (65 FR 42422). UWR chinook salmon were listed as threatened on March 24, 1999 (64 FR 14308), and protective regulations issued on July 10, 2000 (65 FR 42422). This consultation is conducted pursuant to section 7(a)(2) of the ESA and its implementing regulations, 50 CFR 402.

1.2 Proposed Action

The proposed action includes: Leveling and overlay of Highway 212, beginning on the Rock Creek Bridge and concluding prior to the city of Boring; construction of turn lanes and traverse medians; road widening, shoulder widening, construction of new curbs and sidewalks; replacement and/or retrofit of existing culverts; construction of retaining walls; upgrade of drainage facilities and construction of stormwater treatment facilities; and compensatory riparian and fish passage mitigation.

Direct effects to listed species may occur at the project site and may extend upstream or downstream based on the potential for impairing fish passage, change to stream hydraulics, sediment and pollutant discharge, risk of chemical contamination of the aquatic environment, stormwater effects, and the extent of riparian habitat modifications. Indirect effects to listed species may occur throughout the watershed where actions described in this Opinion lead to additional activities or affect ecological functions contributing to stream degradation. As such, the action area for the proposed activities includes the immediate watershed where the proposed action will occur, and those areas upstream and downstream that may reasonably be affected, temporarily or in the long term. For the purposes of this Opinion, the action area is defined as the streambed and streambank of Rock Creek, Richardson Creek, the unnamed tributary of

Richardson Creek, Noyer Creek, and North Fork of Deep Creek, extending to the upstream project disturbance limits and downstream one mile below the project disturbance limits. Other areas of the these watersheds will not be directly affected. There will be temporary indirect effects (temperature modification and sedimentation) to Richardson Creek and the unnamed tributary to Richardson Creek within the action area, caused by the in-water work, culvert modifications, and general riparian and bank disturbance.

All in-water work activities will occur during the standard in-water work timing guideline[1] of July 15 through August 31. The project BA includes a set of conservation measures or best management practices (BMPs) designed to minimize adverse effects on steelhead and chinook salmon, as well as their habitats. These BMPs are described on pages 41-47 of the BA. Specific BMPs for erosion and sediment control, culvert cleaning, planting, in-water work, clearing and grubbing, temporary drainage facilities, hazardous materials, and site-specific conservation measures are included. NOAA Fisheries regards these BMPs as integral components of the project and considers them to be part of the proposed action.

1.2.1 General Road Reconstruction

The proposed action will include: Widening of the highway and highway shoulders to accommodate new or reconstructed turn lanes; traverse medians; curbs; sidewalks; retaining walls; and the replacement, extension, lining, or retrofitting of seven cross drainage culverts and two fish culverts. Construction activities will include: Grinding of existing asphalt; construction or reconstruction of new and existing subgrade and shoulders; and cast-in-place sidewalks, guardrails, and drainage curbs. The finished project will result in a total of 1.3 hectare (ha) of new impervious surface, and 0.16 ha of partially-pervious rocked shoulder. General construction and road widening will result in the loss of 1,030 various native and non-native upland trees and six small willow trees from the Richardson Creek riparian area downstream of the culvert crossing.

1.2.2 Rock Creek Bridge

The proposed action will include the asphalt-concrete (AC) grinding of the top layer of driving surface on the Rock Creek Bridge. AC grindings will be removed and hauled to an appropriate off-site location for disposal. To minimize the likelihood of adverse effects to Rock Creek water quality and hydrology during construction and in the long term, the bridge scuppers will be plugged and stormwater will be rerouted approximately 80 meters (m) along a drainage curb to an existing vegetated upland area. V-shaped notches along the vegetated area will allow stormwater from the bridge and adjacent roadway to dissipate through the rock shoulder and sheetflow through approximately 80 m of vegetated upland and riparian area prior to infiltration

[1]Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000)(identifying work periods with the least impact on fish)(http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf).

or sheetflow into Rock Creek. The AC that is ground out and hauled off-site for proper disposal will not be replaced on the bridge surface.

1.2.3 Richardson Creek Culvert

The proposed action will include the extension and realignment or replacement of the Richardson Creek Culvert at MP 3.47. The culvert extension and realignment or replacement will result in the loss of up to 28 m of roadside ditch on the upstream side of the crossing, and 10 m of Richardson Creek channel on the downstream side. The current culvert is a barrier to upstream fish migration. Fish habitat has been eliminated on the upstream side of the crossing as a result of the upstream landowner reconstructing the creek channel into a wide swale with no fish habitat. Retaining walls will be used to minimize the length of channel loss at the crossing.

Stabilization of the new culvert outlet will require the construction of a toe trench and the placement of class 440 to 660 riprap. The placement of riprap in combination with the retaining walls will prevent channel erosion and minimize the length of the culvert extension, thereby limiting Richardson Creek channel loss to 8-10 m. In-water work will occur during the standard in-water work timing of July 15-August 31 (or as approved by a NOAA Fisheries biologist), and may require work area isolation and fish removal if fish are present during construction.

1.2.4 Unnamed Tributary to Richardson Creek Culvert

The proposed action will include the extension and retrofitting for fish passage of the double box culvert crossing at MP 2.67 of the unnamed tributary to Richardson Creek. The existing culvert will be extended approximately 1 m on the downstream side of the crossing in order to facilitate the construction of fill to support a new 1.8 m sidewalk.

The current culvert and proposed extension is very close to a zero percent slope with accumulations of native sediments in both barrels. Currently, the culvert is a barrier to upstream fish migration only at low flow by creating a hydraulic jump at the outlet and sheetflow in the barrels. A rock weir will be installed below the new culvert outlet to create a backwater condition and to facilitate fish passage at all flows. In-water work will occur during the standard in-water work timing of July 15-August 31 (or as approved by a NOAA Fisheries biologist), and may require work area isolation and fish removal if fish are present during construction.

1.2.4 Stormwater Treatment System

The 1.3 ha of new impervious surfaces may result in increases of stormwater runoff within drainage areas of four different tributaries to the Clackamas River. A majority of the stormwater runoff, or that from 1.2 ha, will occur within the Richardson Creek drainage. The remaining stormwater runoff from the 0.1 ha of new impervious surface that does not fully infiltrate will disperse as upland sheet flow or be conveyed by the existing ditch systems prior to direct discharge in Rock, Noyer, and North Fork of Deep Creek drainages.

The FHWA proposes to construct a water quality treatment system of curbs, ditches, culverts, and a water quality swale that will function to convey and treat stormwater runoff from an equivalent of new and existing impervious surface equal to at least 140% of the new impervious surface on the project (1.3 ha) at MP 2.9 within the Richardson Creek drainage. Stormwater will be collected and routed to a facility designed to provide water quality treatment of at least 70% removal of total suspended solids (TSS) and associated pollutants from runoff up to, and including, the water quality storm event[2].

The water quality bioswale will also be designed to function as a detention facility to attenuate increased peak discharge of stormwater from new impervious surfaces. Detention rates will meet or exceed local Clackamas County stormwater standards: (1) The 25-year, 24-hour storm post-development peak rate will be reduced to the pre-development 5-year, 24-hour storm peak discharge rate; and (2) the 2-year, 24-hour storm post-development peak rate will be reduced to ½ the pre-development 2-year, 24-hour storm peak discharge rate. The bottom of the stormwater treatment facility will be specifically designed to use the permeable soils on the project to enhance stormwater infiltration.

1.2.5 Compensatory Mitigation

The proposed action will include retrofit of the unnamed tributary of Richardson Creek culvert crossing to enhance upstream fish passage as described above in section 1.2.4. Compensatory mitigation will also include wetland enhancement on the upstream side of the Richardson Creek culvert. Additionally, 300 native trees will be planted as a riparian enhancement along Richardson Creek on both the upstream and downstream sides of the culvert crossing. Compensatory mitigation is proposed to enhance riparian function within the watershed and offset potential adverse impacts from the proposed action.

1.3 Biological Information

Essential features of salmonid habitat required for the survival and recovery of listed species are: Water quality, water quantity, water temperature, water velocity, substrate, cover/shelter, food, space, and safe passage conditions (NMFS 1996). Together, these factors determine the biotic composition, structure, function, and stability of aquatic and riparian ecosystems and their ability to support the biological requirements of the species (Spence *et al.* 1996).

The processes that produce functional habitat, which are represented by the essential features of salmonid habitat listed above, depend largely on the hydrologic regime (Junk *et al.* 1989, Poff and Ward 1990, National Research Council 1996, Sparks 1992, ISG 2000). Moreover, natural variation in hydrologic conditions, which drive habitat-forming processes, often plays a major role in the population dynamics of aquatic species through influences on reproductive success,

[2]For this project, the water quality storm event is defined as 2/3 of the 2-year 24-hour storm based on studies by the City of Portland. The FHWA assumes this will encompass at least 95% of the annual precipitation for the project area.

life-stage survival, natural disturbance regimes, and biotic interactions (Poff and Ward 1996, Poff *et al.* 1997).

Pacific anadromous salmonid populations in the Pacific Northwest have evolved under the unimpaired flow regimes historically provided by their natal streams. The flow regimes reflect the dynamic character of flowing water systems, which is determined by the quantity, timing and natural variability of stream flow (Reiser 1989). These characteristics drive many of the physical processes in watersheds that are important to salmonid survival and conservation. Unimpaired flow regimes benefit salmonids in two critical ways: (1) They provide temporally and spatially appropriate water quantities to support specific life stages, and (2) they ensure self-sustaining ecosystem processes by which salmonid habitat is created and maintained over time.

Flowing water functions across the many different stream channel shapes and sizes and climatic regimes to: (1) Shape the channel through the movement of sediment; (2) provide habitat diversity through sufficient depth, velocity and pool-riffle structure; and (3) maintain and support riparian vegetation along streambanks (Rosgen 1996, Leopold 1970, NRC 1996). Streamflow can be considered a "master variable" that limits the distribution and abundance of riverine species and regulates the ecological function of flowing water systems (Powers *et al.* 1985).

Dynamic hydraulic, geomorphic, and ecologic processes must be maintained to provide salmonids a high probability of access to sufficient quantities of quality habitats for timely and successful completion of each and every life stage in freshwater (Bisson *et al.* 1997). However, given inter-annual hydrologic variability, even under an unimpaired flow regime, the quantity and quality of freshwater habitat necessary to obtain food and grow, escape predation, resist disease, migrate, and survive extreme environmental events is highly variable and can readily become limiting (Bjornn and Reiser 1991). Stream-rearing salmonids must survive extended periods in freshwater through winter and summer rearing bottlenecks (Bjornn and Reiser 1991). In addition, environmental conditions during extensive downstream and upstream migrations during juvenile and smolt life stages and again during adult and pre-spawning life stages can also significantly limit survival (NMFS 2001).

1.4 Evaluating Proposed Action

The standards for determining jeopardy are set forth in section 7(a)(2) of the ESA as defined by 50 CFR Part 402 (the consultation regulations). NOAA Fisheries must determine whether the action is likely to jeopardize the listed species. This analysis involves the initial steps of defining the biological requirements and current status of the listed species, and evaluating the relevance of the environmental baseline to the species' current status.

Subsequently, NOAA Fisheries evaluates whether the action is likely to jeopardize the listed species by determining if the species can be expected to survive with an adequate potential for recovery. In making this determination, NOAA Fisheries must consider the estimated level of mortality attributable to: (1) Collective effects of the proposed or continuing action, (2) the

environmental baseline, and (3) any cumulative effects. If NOAA Fisheries finds that the action is likely to jeopardize the listed species, NOAA Fisheries must identify reasonable and prudent alternatives for the action. For the proposed action, a jeopardy analysis by NOAA Fisheries considers direct or indirect mortality of fish attributable to the action.

1.4.1 Biological Requirements

The first step in the methods NOAA Fisheries uses for applying the ESA section 7(a)(2) to listed salmonids is to define the species' biological requirements that are most relevant to each consultation. NOAA Fisheries also considers the current status of the listed species, taking into consideration population size, trends, distribution and genetic diversity. To assess the current status of the listed species, NOAA Fisheries starts with the determinations made in its decision to list the species for ESA protection and also considers new data available that is relevant to the determination.

The relevant biological requirements are those necessary for the listed species to survive and recover to a naturally-reproducing population level at which protection under the ESA would become unnecessary. Adequate population levels must safeguard the genetic diversity of the listed stock, enhance its capacity to adapt to various environmental conditions, and allow it to become self-sustaining in the natural environment.

For this consultation, the biological requirements are improved habitat characteristics that function to support successful spawning, rearing and migration. The current status of the listed species, based upon their risk of extinction, has not significantly improved since the species were listed.

1.4.2 Upper Willamette River Chinook Salmon

The UWR chinook ESU includes native spring-run populations above Willamette Falls and in the Clackamas River. In the past, it included sizable numbers of spawning salmon in the Santiam River, the middle fork of the Willamette River, the McKenzie River, and smaller numbers in the Molalla River, Calapooia River, and Albiqua Creek. Although the total number of fish returning to the Willamette has been relatively high (24,000-80,000 in 1995-2001[3]), about 4,000 fish now spawn naturally in the ESU, 2/3 of which originate in hatcheries. The McKenzie River supports the only remaining naturally-reproducing population in the ESU (ODFW (1998b)).

No direct estimate of the size of the chinook salmon runs in the Willamette River basin was made before the 1940s. McKernan and Mattson (1950) present anecdotal information that the Native American fishery at Willamette Falls may have yielded 2,000,000 lb. (908,000 kg) of salmon (454,000 fish, each weighing 20 lb. [9.08 kg]). Based on egg collections at salmon

[3]Oregon Department of Fish and Wildlife, Willamette River Fish Passage Website (http://www.dfw.state.or.us/ODFWhtml/InfoCntrFish/InterFish/Willam.html)

hatcheries, Mattson (1948) estimates that the spring chinook salmon run in the 1920's may have been five times the run size of 55,000 fish in 1947, or 275,000 fish. Much of the early information on salmon runs in the upper Willamette River basin comes from operation reports of state and Federal hatcheries.

Fish in this ESU are distinct from those of adjacent ESUs in life history and marine distribution. The life history of chinook salmon within the Upper Willamette River ESU includes traits from both ocean and stream-type development strategies. Coded-wire-tag (CWT) recoveries show that the fish travel to the marine waters off British Columbia and Alaska. More UWR fish are, however, recovered in Alaskan waters than from the Lower Columbia River ESU. UWR chinook mature in their fourth or fifth year. Historically, 5-year-old fish dominated the spawning migration runs; recently, however, most fish have matured at age 4. The timing of the spawning migration is limited by Willamette Falls. High flows in the spring allow access to the upper Willamette River basin, whereas low flows in the summer and autumn prevent later-migrating fish from ascending the falls. The low flows may serve as an isolating mechanism, separating this ESU from others nearby.

Human activities have had enormous effects on the salmonid populations in the Willamette River drainage. The Willamette River, once a highly braided river system, has been dramatically simplified through channelization, dredging, and other activities that have reduced rearing habitats (*i.e.*, stream shoreline) by as much as 75%. In addition, the construction of 37 dams within the basin has blocked access to over 700-km of stream and river spawning habitat. The dams also alter the temperature regime of the Willamette River and its tributaries, affecting the timing of development of naturally-spawned eggs and fry. Water quality is also affected by development and other economic activities. Agricultural and urban land uses on the valley floor, and timber harvesting in the Cascade and Coast Ranges, contribute to increased erosion and sediment load in basin streams and rivers. Finally, since at least the 1920s, the lower Willamette River has received municipal and industrial pollution.

Hatchery production in the basin began in the late nineteenth century. Eggs were transported throughout the basin, resulting in current populations that are relatively homogeneous genetically (although still distinct from those of surrounding ESUs). Hatchery production continues, with an average of 8.4 million smolts and fingerlings released each year into the main river or its tributaries between 1975 and 1994. Hatcheries are currently responsible for most production (90% of escapement) in the basin. The Clackamas River currently accounts for about 20% of the production potential in the Willamette River Basin, originating from one hatchery plus natural production areas that are primarily above the North Fork Dam. The interim escapement goal for the area above North Fork Dam is 2,900 fish (ODFW 1998c). However, the system is so heavily influenced by hatchery production that distinguishing spawners of natural stock from hatchery origin fish is difficult. Approximately 1,000 to 1,500 adults have been counted at the North Fork Dam in recent years.

Harvest on this ESU has been high, both in the ocean and in-river. The total in-river harvest below the falls from 1991-1995 averaged 33%, and was much higher in previous years. Ocean

harvest was estimated at 16% for 1982-1989. ODFW (1998a) states that total (marine and freshwater) harvest rates on UWR spring-run stocks were reduced considerably for the 1991-1993 brood years, to an average of 21%. Recent efforts to mark all hatchery spring-run chinook salmon by removal of the adipose fin and execution of selective sport and commercial fisheries in the basin, have lowered impacts to incidental hooking and netting mortality only on wild fish.

Although UWR chinook salmon have not been documented within the creeks within the action area, both adult and juvenile UWR chinook spawn, rear, and migrate in the Clackamas River watershed immediately downstream of the action area. Both adult and juvenile chinook salmon have been observed to enter tributary streams during migration for brief periods to seek refuge from mainstem flood conditions or thermal stress, among other reasons.

1.4.3 Lower Columbia River Steelhead

Although limited data are available to assess population numbers or trends, NOAA Fisheries believes that many steelhead stocks comprising the LCR steelhead ESU are depressed compared with past abundance. Biological information is described in Busby *et al.* (1996), NMFS (1997), and Federal Register (March 19, 1998, 63 FR 13347).

Adult winter steelhead in this ESU typically reenter the river systems starting in November through the end of March. Peak reentry is in January and February. The adults spawn soon after reentering. The fry emerge from April and into July, and then rear in freshwater for 1-3 years. The juvenile fish smolt in the spring and emigrate downstream to the Pacific Ocean from March through June during high spring flows. Summer steelhead reenter freshwater as sexual immature in June and July, and require several months of maturation before spawning. The summer steelhead overwinter in freshwater until they spawn in late winter to early spring. In the LCR steelhead ESU, most spawning occurs from March through May.

No estimates of historical (pre-1960's) abundance data are available for this ESU (Busby *et al.* 1996). Estimates from the 1980's showed that 75% of the total run was of hatchery origin. Habitat degradation is common throughout the ESU, primarily due to urbanization and logging. The habitat degradation affects summer steelhead more than winter steelhead. Past and present hatchery practices are a major threat to the genetic integrity of steelhead in the ESU. Both currently and historically, these creeks within the action area, supported runs of winter steelhead.

1.4.4 Environmental Baseline

The environmental baseline is an analysis of the effects of past and ongoing human and natural factors leading to the current status of the species or its habitat and ecosystem within the action area. The action area is defined as all areas (bankline, adjacent riparian zone, and aquatic area) to be affected directly or indirectly by the Federal action, and not merely the immediate area involved in the action (50 CFR 402.02).

Rock, Richardson, the unnamed tributary to Richardson, Noyer, and North Fork of Deep Creeks are all tributaries to the Clackamas River which is within the Willamette Valley ecoregion. The following discussion is from the Oregon Progress Board (2000) *Oregon State of the Environment Report*:

> "The ecoregion is characterized by broad, alluvial flats and low basalt hills, with soils of deep alluvial silts from river deposits and dense heavy clays from pluvial deposits in the valley bottom's numerous oxbow lakes and ponds. Seventy percent of the state's population lives within the ecoregion, and consequently the landscape of the valley has changed with development. The Willamette Valley ecoregion is largely in private ownership: agriculture, urban and forest land dominate. Over the past 150 years, the prairies have been largely converted to farmland, as have most of the riparian forests and wetlands. The rivers have been dammed and channelized to reduce flooding. Natural processes such as fire and flooding have been almost entirely excluded. Trends in riparian condition in the Willamette Valley have shown an 80% reduction in total riparian area since the 1850s. The Willamette Restoration Initiative reports an estimated 72% of the original riparian and bottomland forest is gone, as well as an estimated 99% of wet prairies, and 87% of upland forests at the margins of the valley."

The Clackamas River flows 134 kilometers from its headwaters to its confluence with the Willamette River in Oregon City, Oregon. The Clackamas River watershed has been affected by timber harvest, agriculture and urbanization. Land use is primarily industrial timber and residential development in the upper watershed and commercial/industrial/railroad in the lower watershed. The density of paved roads is high and, in several locations, paved surfaces abut the watershed drainages.

Habitat complexity is limited in the lower watershed. The streams generally lack secondary channels, undercut banks, and large woody material to provide good instream structure for summer rearing and winter refuge. Fish cover is limited to boulders and pool depth, although depths are generally shallow. In many reaches, the channel has been straightened or dredged. Large woody material in the channel is rare.

Within the project reach, habitat complexity is low. The reach is predominantly extended linear cobble riffle runs with limited, very small pools, few large boulders and sparse large wood. Fish passage is poor within the Clackamas River watershed. Many culverts within the watershed are passage barriers at various times of the year. Summer low flows can effectively dewater some culverts, and other culverts are problematic at various flows. Besides the culverts, small dams and weirs, screened and unscreened pumps, and diversions are present throughout the watershed.

The creeks within the action area are not on the Oregon Department of Environmental Quality (ODEQ) 303(d) List of Water Quality Limited Water Bodies because insufficient data are available. However, downstream reaches of the mainstem Clackamas River are 303(d) listed for temperature, and temperatures within the action area are likely to exceed the water quality

criteria during the summer. Sediment loading is problematic as well. Low dissolved oxygen concentrations may also limit salmonid distribution during low flow periods.

NOAA Fisheries concludes that not all of the biological requirements of the species within the action area are being met under current conditions. This conclusion is based on the best available information on: (1)The status of the affected species; (2) information regarding population status, trends, and genetics; and (3) the environmental baseline conditions within the action area. Significant improvement in habitat conditions over those currently available under the environmental baseline is needed to meet the biological requirements for survival and recovery of these species. Any further degradation of these conditions would have a significant impact due to the amount of risk they presently face under the environmental baseline.

1.5 Analysis of Effects

1.5.1 Effects of Proposed Action

Creeks and rivers are dynamic systems that naturally alter their courses in response to many physical processes. Roadways and other structures constructed along waterways are subject to flooding and undercutting as a result of these natural changes in the stream course. Structural hardening of embankments is the traditional means of protecting these structures along waterways. The structural hardening also results in impacts to the waterway.

Impacts to waterways from installation of inadequate culvert crossings and hardened embankments result in simplification of stream channels, alteration of hydraulic processes, and prevention of natural channel adjustments (Spence *et al.* 1996). Moreover, embankment hardening at culvert crossings may shift the erosion point upstream or downstream of the project site and contribute to stream velocity acceleration. As amplified erosive forces attack different locations, and landowners respond with more bank hardening, the creek eventually attains a continuous fixed alignment lacking habitat complexity (USACE 1977).

Fish habitats are enhanced by the diversity of habitats at the land-water interface and adjacent bank (USACE 1977). Streamside vegetation provides shade that reduces water temperature. Overhanging branches provide cover from predators. Insects and other invertebrates that fall from overhanging branches may be preyed upon by fish, or provide food sources for other prey organisms. Immersed vegetation, logs, and root wads provide points of attachment for aquatic prey organisms, shelter from swift currents during high flow events, retain bedload materials, and reduce flow velocity. Retaining walls have been incorporated into the proposed action to limit the amount of fill and need for bank hardening around the culvert outlets.

Sedimentation.
Potential impacts to listed salmonids from the proposed action include both direct and indirect effects. Potential direct effects include mortality from exposure to suspended sediments (turbidity) and contaminants resulting from construction. Potential indirect effects include

behavioral changes resulting from elevated turbidity level (Sigler *et al.* 1984, Berg and Northcote 1985, Whitman *et al.* 1982, Gregory 1988), during river bank habitat alterations.

Suspended sediment and turbidity influences on fish reported in the literature range from beneficial to detrimental. Elevated total suspended solids (TSS) conditions have been reported to enhance cover conditions, reduce piscivorus fish/bird predation rates, and improve survival. Elevated TSS conditions have also been reported to cause physiological stress, reduce growth, and adversely affect survival. Of key importance in considering the detrimental effects of TSS on fish are the frequency and the duration of the exposure, not just the TSS concentration.

Behavioral avoidance of turbid waters may be one of the most important effects of suspended sediments (DeVore *et al.* 1980, Birtwell *et al.* 1984, Scannell 1988). Salmonids have been observed to move laterally and downstream to avoid turbid plumes (McLeay *et al.* 1984, 1987, Sigler *et al.* 1984, Lloyd 1987, Scannell 1988, Servizi and Martens 1991). Juvenile salmonids tend to avoid streams that are chronically turbid, such as glacial streams or those disturbed by human activities, unless the fish need to traverse these streams along migration routes (Lloyd *et al.* 1987). In addition, a potentially positive reported effect is providing refuge and cover from predation (Gregory and Levings 1988).

Fish that remain in turbid, or elevated TSS, waters experience a reduction in predation from piscivorus fish and birds (Gregory and Levings 1998). In systems with intense predation pressure, this provides a beneficial trade off (*e.g.*, enhanced survival) to the cost of potential physical effects (*e.g.*, reduced growth). Turbidity levels of about 23 nephalometric turbidity units (NTU) have been found to minimize bird and fish predation risks (Gregory 1993). Exposure duration is a critical determinant of the occurrence, and the importance of physical or behavioral effects (Newcombe and MacDonald 1991). Salmonids have evolved in systems that periodically experience short-term pulses (days to weeks) of high suspended sediment loads, often associated with flood events, and are adapted to such high pulse exposures. Adult and larger juvenile salmonids may be little affected by the high concentrations of suspended sediments that occur during storm and snowmelt runoff episodes (Bjorn and Reiser 1991). However, research shows that chronic exposure can cause physiological stress responses that can increase maintenance energy and reduce feeding and growth (Redding *et al.* 1987, Lloyd 1987, Servizi and Martens 1991).

Turbidity, at moderate levels, has the potential to adversely affect primary and secondary productivity, and at high levels, has the potential to injure and kill adult and juvenile fish, and may also interfere with feeding (Spence *et al.* 1996). Newly emerged salmonid fry may be vulnerable to even moderate amounts of turbidity (Bjornn and Reiser 1991). Other behavioral effects on fish, such as gill flaring and feeding changes, have been observed in response to pulses of suspended sediment (Berg and Northcote 1985). Fine redeposited sediments also have the potential to adversely affect primary and secondary productivity (Spence *et al.* 1996), and to reduce incubation success (Bell 1991) and cover for juvenile salmonids (Bjornn and Reiser 1991).

Excavation in the stream channel associated with the culvert work will elevate the risk for turbidity and sediment transport within the action area. Because the potential for turbidity should be localized and brief, the probability of direct mortality is negligible. Work area isolation will be employed as necessary, depending on presence of fish and/or flowing water to minimize the risk from turbidity and sediment transport during in-water work activities.

Chemical Contamination.
As with all construction activities, accidental release of fuel, oil, and other contaminants may occur. Operation of the back-hoes, excavators, and other equipment requires the use of fuel, lubricants, etc., which, if spilled into the channel of a water body or into the adjacent riparian zone, can injure or kill aquatic organisms. Petroleum-based contaminants (such as fuel, oil, and some hydraulic fluids) contain poly-cyclic aromatic hydrocarbons (PAHs), which can be acutely toxic to salmonids at high levels of exposure and can also cause chronic lethal and acute and chronic sublethal effects to aquatic organisms (Neff 1985). Similarly, exposure to herbicides can have lethal and sublethal effects on salmonids, aquatic invertebrates, aquatic vegetation, and target and non target riparian vegetation (Spence *et al.* 1996).

Excavation in the stream channel associated with the culvert work will elevate the risk for chemical contamination of the aquatic environment within the action area. Because the potential for chemical contamination should be localized and brief, the probability of direct mortality is negligible. Work area isolation will be employed as necessary depending on presence of fish and/or flowing water to minimize the risk from chemical contamination during in-water work activities. The contractor is also required to develop, implement and monitor a pollution control plan in the effort to further minimize risk to the aquatic environment.

Loss of Primary Productivity.
The proposed action will likely result in a short-term reduction in primary productivity in the newly cleaned or dredged channel locations. As creek flow is reintroduced into these altered culvert crossings, redistribution of aquatic vegetation and benthic invertebrates will result in a temporary reduction in the availability of food for rearing juvenile salmonids. Carrying capacity of rearing juvenile salmonids may be decreased in the short term if inadequate water and water quality persist during and after the in-water work period.

Fish Rescue, Salvage and Relocation.
As a result of the proposed action, culvert alteration activities may be isolated from flowing water and fish may be relocated if present during construction as described above in section 1.2. The FHWA has estimated the lethal and non-lethal take of listed salmonids likely to be captured and released as a result of the work area isolations. Rescue, salvage and relocation of fish and other aquatic species is estimated to result in the potential capture and handling of up to 40 juvenile LCR steelhead or UWR chinook. The BA assumes a 2% direct or delayed mortality rate from capture and relocation stress, up to 2 juvenile listed salmonids may be killed. NOAA Fisheries anticipates up to 40 listed juvenile steelhead or chinook salmon may be handled resulting in the lethal take of up to 2 listed juvenile LCR steelhead or UWR chinook .

Water Quality Stormwater Effects.
The potential exists for an increase in polluted runoff into the creeks within the project area from the proposed 1.3 ha of new impervious surface (Booth and Jackson 1997). However, the proposed stormwater runoff treatment system will more than offset any potential increase in adverse effects to water quality as a result of the proposed action. The proposed stormwater treatment system will treat stormwater runoff from an equivalent of the 1.3 ha of new impervious surfaces. This stormwater treatment system includes construction of various engineered and non-engineered features designed to remove of at least 70% of TSS, oil, grease and floatables from storms up to, and including, a water quality storm event[4]. Fully treated stormwater that does not infiltrate into the soils will then discharge into existing riparian areas or directly into Richardson Creek. The proposed riparian plantings, as a part of the compensatory mitigation, will also help to improve water quality through filtration and infiltration of stormwater runoff from new and existing impervious surfaces. The proposed project is expected have a net beneficial effect on water quality in Rock and Richardson Creeks in the long term, with negligible effects to Noyer and the North Fork of Deep Creeks.

Hydrologic Stormwater Effects.
The potential exists for reduced evapotransporation and infiltration opportunities resulting in an increase in the magnitude and duration of peak discharge and decreased summer base flow from the proposed 1.3 ha of new impervious surface (Booth and Jackson 1997). The proposed riparian plantings, as a part of the compensatory mitigation, will help to attenuate peak flows through filtration, infiltration, and evapotransporation of stormwater runoff from new and existing impervious surfaces. The proposed stormwater runoff treatment system, coupled with the proposed riparian plantings along Richardson Creek will more than offset any potential adverse effects to hydrology from the proposed action.

Riparian Vegetation.
Woody riparian vegetation provides large wood to the stream, which encourages the creation of rearing and spawning areas. Riparian vegetation also provides water quality functions (*e.g.* temperature control and nutrient transformation), bank stability, detritus (insect and leaf input, small wood for substrate for insects, etc.), microclimate formation, floodplain sediment retention and vegetative filtering, and recharge of the stream hyporheic zone. The proposed action will result in the removal of five small-diameter willow trees from the riparian corridor along Richardson Creek. The compensatory mitigation plan will result in the replanting of 300 various native trees in the riparian corridor along Richardson Creek. The immediate gain of plantings and eventual gain of a mature woody riparian buffers along the Richardson Creek riparian corridor will increase the ability of the riparian area to support natural stream processes, including processes essential to supporting salmon in the short and long term.

Fish Passage.

[4]For this project, the water quality storm event is defined as 2/3 of the 2-year, 24-hour storm and based on studies by the City of Portland, the FHWA assumes this will encompass at least 95% of the annual precipitation for the project area.

The proposed action includes retrofitting the unnamed tributary to Richardson Creek culvert crossing with a rock weir to enhance upstream fish passage during all flows. This aspect of the proposed action is expected to result in a long-term beneficial effect to listed species at the population level within the Richardson Creek drainage.

1.5.2 Interrelated Effects

Interrelated effects include the effects from actions that are part of the larger action and depend on the larger action for justification. Many overhead and underground utilities run adjacent to Highway 212 and will need to be temporarily or permanently moved to facilitate the proposed action. The movement of these and other various utilities will require ground disturbance. However, these potential adverse effects are not different or beyond the scope of those analyzed in section 1.5.1 above.

1.5.3 Cumulative Effects

Cumulative effects are defined in 50 CFR 402.02 as those effects of "future State or private activities, not involving Federal activities, that are reasonably certain to occur within the action area of the Federal action subject to consultation." Future Federal actions, including the ongoing operation of hydropower systems, hatcheries, fisheries, and land management activities are being (or have been) reviewed through separate section 7 consultation processes. Therefore, these actions are not considered cumulative to the proposed actions.

NOAA Fisheries is not aware of any specific future non-federal activities within the action area that would cause greater impacts to listed species than presently occurs. However, development of structures and vegetation clearing along the streams is likely to continue. NOAA Fisheries assumes that future private and state actions will continue at similar intensities as in recent years**.**

1.6 Conclusion

NOAA Fisheries has determined, based on the available information, that the proposed actions covered in this Opinion are not likely to jeopardize the continued existence of listed salmonids. NOAA Fisheries used the best available scientific and commercial data to apply its jeopardy analysis when analyzing the effects of the proposed action on the biological requirements of the species relative to the environmental baseline, together with cumulative effects. NOAA Fisheries believes that the proposed action would cause a minor, short-term degradation of anadromous salmonid habitat due to turbidity, risk of chemical contamination, loss of primary productivity caused by fill and excavation below the two-year flood elevation. NOAA Fisheries further believes that the proposed action may cause long-term degradation of a small amount of anadromous salmonid habitat due to a loss of up to 10 m of rearing habitat, and direct mortality may occur as a result of the work area isolation and fish removal effort. However, NOAA Fisheries believes that, overall, the proposed action would result in long-term beneficial effects to anadramous salmonids and habitat from improved water quality, hydrology, and fish passage conditions.

1.7 Reinitiation of Consultation

Consultation must be reinitiated if: (1) The amount or extent of taking specified in the Incidental Take Statement is exceeded, or is expected to be exceeded; (2) new information reveals effects of the action may affect listed species in a way not previously considered; the action is modified in a way that causes an effect on listed species that was not previously considered; or (3) a new species is listed or critical habitat is designated that may be affected by the action (50 C.F.R. 402.16). To reinitiate consultation, contact the Oregon Habitat Branch of NOAA Fisheries.

2. INCIDENTAL TAKE STATEMENT

Section 9 and rules promulgated under section 4(d) of the ESA prohibit any taking (harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, collect, or attempt to engage in any such conduct) of listed species without a specific permit or exemption. "Harm" is further defined to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, and sheltering. "Harass" is defined as actions that create the likelihood of injuring listed species by annoying it to such an extent as to significantly alter normal behavior patterns which include, but are not limited to, breeding, feeding, and sheltering. "Incidental take" is take of listed animal species that results from, but is not the purpose of, the federal agency or the applicant carrying out an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to, and not intended as part of, the agency action is not considered prohibited taking provided that such taking is in compliance with the terms and conditions of this incidental take statement.

An incidental take statement specifies the impact of any incidental taking of threatened species. It also provides reasonable and prudent measures that are necessary to minimize impacts and sets forth terms and conditions with which the action agency must comply in order to implement the reasonable and prudent measures.

2.1 Amount or Extent of the Take

NOAA Fisheries anticipates that the actions covered by this Opinion are reasonably likely to result in incidental take of LCR steelhead or UWR chinook salmon because of adverse effects from increased sediment levels and chemical contamination. Handling of juvenile LCR steelhead and UWR chinook salmon during the work area isolation process may result in incidental take of individuals if juveniles are present in the action area during construction. NOAA Fisheries anticipates non-lethal incidental take of up to 40 individuals, and lethal take of up to 2 juvenile LCR steelhead or UWR chinook salmon could occur as a result of the fish rescue, salvage and relocation activities covered by this Opinion. The effects of the other activities on population levels are largely unquantifiable, and NOAA Fisheries does not expect them to be measurable in the long term. The extent of authorized take is limited to LCR steelhead and UWR chinook salmon in Rock, Richardson, unnamed tributary to Richardson,

Noyer, and North Fork of Deep Creeks and is limited to that caused by the proposed action within the action area.

2.2 Reasonable and Prudent Measures

The measures described below are non-discretionary. They must be implemented so that they become binding conditions in order for the exemption in section 7(a)(2) to apply. The FHWA has the continuing duty to regulate the activities covered in this incidental take statement. If the FHWA fails to adhere to the terms and conditions of the incidental take statement through enforceable terms added to the document authorizing this action, or fails to retain the oversight to ensure compliance with these terms and conditions, the protective coverage of section 7(a)(2) may lapse.

NOAA Fisheries believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of the above species. The FHWA shall:

1. Minimize incidental take from the proposed action and general construction by ensuring that the all activities avoid or minimize adverse effects to riparian and aquatic systems.

2. Ensure completion of a comprehensive monitoring and reporting program to confirm this Opinion is meeting its objective of minimizing take from the proposed action.

2.3 Terms and Conditions

To be exempt from the prohibitions of section 9 of the ESA, the FHWA must comply with the following terms and conditions, which implement the reasonable and prudent measures described above. These terms and conditions are non-discretionary and, in relevant part, apply to the proposed action.

1. To implement Reasonable and Prudent Measure #1 (minimize incidental take), the FHWA shall ensure that:
   a. Timing of in-water work. Work within the active channel will be completed during the ODFW (2000) preferred in-water work period[5], as appropriate for the project area, unless otherwise approved in writing by NOAA Fisheries.
   b. Cessation of work. Project operations will cease under high flow conditions that may result in inundation of the project area, except for efforts to avoid or minimize resource damage.

[5] Oregon Department of Fish and Wildlife, *Guidelines for Timing of In-Water Work to Protect Fish and Wildlife Resources*, 12 pp (June 2000) (identifying work periods with the least impact on fish) (http://www.dfw.state.or.us/ODFWhtml/InfoCntrHbt/0600_inwtrguide.pdf); U.S. Army Corps of Engineers, Seattle District, Approved Work Windows for Fish Protection (Version: 13 October 2000) (http://www.nws.usace.army.mil/reg/Programmatic_Consultations/TimCond/WorkWinI.pdf)

c. Fish screens. All water intakes used for a project, including pumps used to isolate an in-water work area, will have a fish screen installed, operated and maintained according to NOAA Fisheries' fish screen criteria, unless fish have been removed from the pump areas and measures are in place to prevent fish from returning to the pump areas.[6]

d. Fish passage. Passage will be provided for any adult or juvenile salmonid species present in the project area during construction. Upstream passage is not required during construction if it did not previously exist.

e. Pollution and Erosion Control Plan. A Pollution and Erosion Control Plan will be prepared and carried out to prevent pollution related to construction operations. The plan must be available for inspection on request by Corps or NOAA Fisheries.

i. Plan Contents. The Pollution and Erosion Control Plan must contain the pertinent elements listed below, and meet requirements of all applicable laws and regulations.

(1) Practices to prevent erosion and sedimentation associated with access roads, stream crossings, construction sites, borrow pit operations, haul roads, equipment and material storage sites, fueling operations and staging areas.

(2) Practices to confine, remove and dispose of excess concrete, cement and other mortars or bonding agents, including measures for washout facilities.

(3) A description of any hazardous products or materials that will be used for the project, including procedures for inventory, storage, handling, and monitoring.

(4) A spill containment and control plan with notification procedures, specific clean up and disposal instructions for different products, quick response containment and clean up measures that will be available on the site, proposed methods for disposal of spilled materials, and employee training for spill containment.

(5) Practices to prevent construction debris from dropping into any stream or water body, and to remove any material that does drop with a minimum disturbance to the streambed and water quality.

ii. Inspection of erosion controls. During construction, all erosion controls must be inspected daily during the rainy season and weekly during the dry season to ensure they are working adequately.[7]

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[6] National Marine Fisheries Service, *Juvenile Fish Screen Criteria* (revised February 16, 1995) and *Addendum: Juvenile Fish Screen Criteria for Pump Intakes* (May 9, 1996) (guidelines and criteria for migrant fish passage facilities, and new pump intakes and existing inadequate pump intake screens) (http://www.nwr.noaa.gov/1hydrop/hydroweb/ferc.htm).

[7] "Working adequately" means no turbidity plumes are evident during any part of the year.

(1) If inspection shows that the erosion controls are ineffective, work crews must be mobilized immediately to make repairs, install replacements, or install additional controls as necessary.

(2) Sediment must be removed from erosion controls once it has reached 1/3 of the exposed height of the control.

f. Construction discharge water. All discharge water created by construction (*e.g.*, concrete washout, pumping for work area isolation, vehicle wash water) will be treated as follows.

i. Water quality. Facilities must be designed, built and maintained to collect and treat all construction discharge water using the best available technology applicable to site conditions. The treatment must remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present.

ii. Discharge velocity. If construction discharge water is released into a stream, water body or wetland using an outfall or diffuser port, velocities must not exceed 4-feet per second.

iii. Spawning areas, marine submerged vegetation. No construction discharge water may be released within 300-feet upstream of active spawning areas or areas with marine submerged vegetation.

g. Preconstruction activity. Before significant[8] alteration of the project area, the following actions must be completed.

i. Marking. Flag the boundaries of clearing limits associated with site access and construction to prevent ground disturbance of critical riparian vegetation, wetlands and other sensitive sites beyond the flagged boundary.

ii. Emergency erosion controls. Ensure that the following materials for emergency erosion control are onsite.

(1) A supply of sediment control materials (*e.g.*, silt fence, straw bales[9]).

(2) An oil-absorbing floating boom whenever surface water is present.

iii. Temporary erosion controls. All temporary erosion controls must be in-place and appropriately installed downslope of project activity within the riparian area until site restoration is complete.

h. Temporary access roads within 150 feet of a stream, water body or wetland.

i. Existing ways. Existing roadways or travel paths must be used whenever possible, unless construction of a new way would result in less habitat take.

ii. Steep slopes. Temporary roads built mid-slope or on slopes steeper than 30 percent are not authorized.

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[8] "Significant" means an effect can be meaningfully measured, detected or evaluated.

[9] When available, certified weed-free straw or hay bales must be used to prevent introduction of noxious weeds.

iii. Minimizing soil disturbance and compaction. When a new temporary road is necessary within 150-feet[10] of a stream, water body or wetland, soil disturbance and compaction must be minimized by clearing vegetation to ground level and placing clean gravel over geotextile fabric, unless otherwise approved in writing by NOAA Fisheries.

iv. Temporary stream crossings.

(1) The number of temporary stream crossings must be minimized.

(2) Temporary road crossings must be designed as follows.

(a) A survey must identify and map any potential spawning habitat within 300-feet downstream of a proposed crossing.

(b) No stream crossing may occur at known or suspected spawning areas, or within 300-feet upstream of such areas if spawning areas may be affected.

(c) The crossing design must provide for foreseeable risks (*e.g.*, flooding and associated bedload and debris) to prevent the diversion of streamflow out of the channel and down the road if the crossing fails.

(d) Vehicles and machinery must cross riparian areas and streams at right angles to the main channel wherever possible.

v. Obliteration. When the project is completed, all temporary access roads must be restored to pre-project condition, the soil must be stabilized, and the site must be revegetated. Temporary roads in wet or flooded areas must be abandoned and restored as necessary by the end of the in-water work period.

i. Heavy Equipment. Use of heavy equipment within 150 feet of a stream, water body or wetland will be restricted as follows.

i. Choice of equipment. When heavy equipment must be used, the equipment selected must have the least adverse effects on the environment (e.g., minimally sized, rubber tired).

ii. Vehicle staging. Vehicles must be fueled, operated, maintained and stored as follows.

(1) Vehicle staging, cleaning, maintenance, refueling, and fuel storage must take place in a vehicle staging area placed 150-feet or more from any stream, water body or wetland.

(2) All vehicles operated within 150-feet of any stream, water body or wetland must be inspected daily for fluid leaks before leaving the vehicle staging area. Any leaks detected must be repaired in the

[10] Distances from a stream or water body are measured horizontally from, and perpendicular to, the bankfull elevation, the edge of the channel migration zone, or the edge of any associated wetland, whichever is greater. "Channel migration zone" means the area defined by the lateral extent of likely movement along a stream reach as shown by evidence of active stream channel movement over the past 100 years, *e.g.*, alluvial fans or floodplains formed where the channel gradient decreases, the valley abruptly widens, or at the confluence of larger streams.

vehicle staging area before the vehicle resumes operation. Inspections must be documented in a record that is available for review on request by Corps or NOAA Fisheries.

(3) All equipment operated instream must be cleaned before beginning operations below the bankfull elevation to remove all external oil, grease, dirt, and mud.

iii. Stationary power equipment. Stationary power equipment (e.g., generators, cranes) operated within 150-feet of any stream, water body or wetland must be diapered or as otherwise described in the BA to prevent leaks, unless otherwise approved in writing by NOAA Fisheries.

j. Site preparation within 150 feet of a stream or water body. Native materials will be conserved for site restoration.

i. If possible, native materials must be left where they are found.

ii. Materials that are moved, damaged or destroyed must be replaced with a functional equivalent during site restoration.

iii. Any large wood[11], native vegetation, weed-free topsoil, and native channel material displaced by construction must be stockpiled for use during site restoration.

k. Isolation of in-water work area. If adult or juvenile fish are reasonably certain to be present, the work area will be well isolated from the active flowing stream using inflatable bags, sandbags, sheet pilings, or similar materials. The work area will also be isolated if in-water work may occur within 300-feet upstream of spawning habitats.

l. Capture and release. Before and intermittently during pumping to isolate an in-water work area, an attempt must be made to capture and release fish from the isolated area using trapping, seining, electrofishing, or other methods as are prudent to minimize risk of injury.

i. A fishery biologist experienced with work area isolation and competent to ensure the safe handling of all ESA-listed fish must conduct or supervise the entire capture and release operation.

ii. If electrofishing equipment is used to capture fish, the capture team must comply with NOAA Fisheries' electrofishing guidelines.[12]

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[11] For purposes of this Opinion only, "large wood" means a tree, log, or rootwad big enough to dissipate stream energy associated with high flows, capture bedload, stabilize streambanks, influence channel characteristics, and otherwise support aquatic habitat function, given the slope and bankfull width of the stream in which the wood occurs. See, Oregon Department of Forestry and Oregon Department of Fish and Wildlife, *A Guide to Placing Large Wood in Streams*, May 1995 (www.odf.state.or.us/FP/RefLibrary/LargeWoodPlacemntGuide5-95.doc).

[12] National Marine Fisheries Service, *Backpack Electrofishing Guidelines* (December 1998) (http://www.nwr.noaa.gov/1salmon/salmesa/pubs/electrog.pdf).

iii. The capture team must handle ESA-listed fish with extreme care, keeping fish in water to the maximum extent possible during seining and transfer procedures to prevent the added stress of out-of-water handling.

iv. Captured fish must be released as near as possible to capture sites.

v. ESA-listed fish may not be transferred to anyone except NOAA Fisheries personnel, unless otherwise approved in writing by NOAA Fisheries.

vi. Other Federal, state, and local permits necessary to conduct the capture and release activity must be obtained.

vii. NOAA Fisheries or its designated representative must be allowed to accompany the capture team during the capture and release activity, and must be allowed to inspect the team's capture and release records and facilities.

m. Earthwork. Earthwork (including drilling, excavation, dredging, filling and compacting) will be completed as quickly as possible.

i. Site stabilization. All disturbed areas must be stabilized, including obliteration of temporary roads, within 12 hours of any break in work unless construction will resume work within 7 days between June 1 and September 30, or within 2 days between October 1 and May 31.

ii. Source of materials. Boulders, rock, woody materials and other natural construction materials used for the project must be obtained outside the riparian area.

n. Construction of new impervious surface/stormwater management. Beyond construction terms and conditions above, any project that will produce new impervious surface or a land cover conversion that slows the entry of water into the soil must also control the quantity and quality of the resulting stormwater runoff for the life of the project.

i. On-site stormwater management.

(1) Stormwater best management practices (BMPs)[13] will be used for stormwater source control and treatment individually or in a series as necessary to minimize, retain, treat, and infiltrate stormwater on-site to the maximum extent feasible without causing flooding or erosion effects. Stormwater BMP installation in the riparian buffer area may be allowed with prior written approval from NOAA

[13] For purposes of this Opinion, "stormwater BMP" means a procedure or structure that, when used individually or in series, will avoid or minimize the adverse effects of stormwater on riparian and aquatic habitats. On-site stormwater BMPs include source controls to prevent the production and release of pollutants, and treatments that capture pollutants. A source control can be operational (*i.e.*, managerial) or structural (*i.e.*, a physical or mechanical facility). **Implement appropriate** on-site BMPs such as downspout dispersion, concentrated flow dispersion , sheet flow dispersion, full dispersion , concave vegetated surfaces, multiple small basins, engineered soil/landscape system, infiltration basins, infiltration trenches, bio-filtration swales, basic biofiltration swales, wet biofiltration swales, continuous inflow biofiltration swales, basic filter strips , narrow area filter strips, wetponds, and stormwater treatment wetlands. For a discussion of stormwater BMPs, see, *e.g.*, Washington Department of Ecology, Water Quality Program, Stormwater Management Manual for Western Washington, Publication Numbers 99-11 through 99-15 (August 2001) (http://www.ecy.wa.gov/programs/wq/stormwater/index.html

Fisheries. (Actions with no more than a negligible likelihood of adverse effects.)

(2) Permeable pavements[14] must be installed and maintained for load-bearing surfaces, including multiple use trails, wherever soil, slope and traffic conditions allow.

ii. Runoff treatment facilities.[15]

(1) Water quality treatment must be provided to remove debris, nutrients, sediment, petroleum hydrocarbons, metals and other pollutants likely to be present using the best available technology applicable to site conditions.

(2) Treatment facilities and BMPs will not be installed inside the riparian buffer area without prior written approval from NOAA Fisheries.

(3) Runoff from pollution generating impervious surfaces must be pre-treated[16] to reduce suspended solids before use of infiltration BMPs.

(4) Stormwater treatment facilities and BMPs for each project will include a schedule of operation, inspection and maintenance activities for all structural BMPs and conveyance systems. Operation, inspection and maintenance of stormwater treatment facilities will be conducted as describe in ODOT Routine Road Maintenance Manual[17]. These operations, inspection and maintenance activities must be conducted, as appropriate, to achieve the following objectives:

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[14] **Implement appropriate** permeable pavements such as porous asphalt and porous concrete, porous pavers, and permeable interlocking concrete pavement. For a discussion of stormwater BMPs, see, *e.g.*, Washington Department of Ecology, Water Quality Program, Stormwater Management Manual for Western Washington, Publication Numbers 99-11 through 99-15 (August 2001) (http://www.ecy.wa.gov/programs/wq/stormwater/index.html).

[15] **Implement appropriate** water quality treatment facilities such as biofiltration swales, constructed wetlands, detention ponds, or oil/water separators. For a discussion of treatment facilities see, *e.g.*, Washington Department of Ecology, Water Quality Program, Stormwater Management Manual for Western Washington, Publication Numbers 99-11 through 99-15 (August 2001) (http://www.ecy.wa.gov/programs/wq/stormwater/index.html).

[16] **Implement appropriate** pretreatment BMPs such as pre-settling basins.

[17] Oregon Department of Transportation, *Routine Road Maintenance: Water Quality and Habitat Guide, Best Management Practices*, 21 pp. + appendices (July 1999) (providing guidance on routine road maintenance activity only) (http://www.odot.state.or.us/eshtm/images/4dman.pdf) or, see, National Marine Fisheries Service, Regional Road Maintenance Endangered Species Act Program Guidelines (March 2002) (http://www.metrokc.gov/roadcon/bmp/pdfguide.htm)

(a) Ensure that the capacity of each facility, structural BMP and conveyance system is not exceeded and that heavy sediment discharges are prevented.

(b) Inspect and clean each structural BMP and conveyance system as needed. Determine whether improvements in operation and maintenance are needed.

(c) Promptly repair any deterioration threatening the effectiveness of any structural BMP or conveyance system.

(d) If storm drains inlets are used, post warning signs on or next to all storm drain inlets that say, as appropriate for the receiving water, "Dump No Waste - Drains to Ground Water, Streams, or Lakes."

(e) Ensure that all sediments and liquids from catch basins are disposed of only in an approved facility.

iii. Flow Control. When runoff must be discharged directly, or indirectly through a conveyance system, into fresh surface water or a wetland, the following requirements apply.

(1) Natural drainage patterns must be maintained. Discharges from the project site must occur at the natural location, to the maximum feasible extent. Discharge of runoff from the project site must not cause an adverse effect to riparian or aquatic habitats.

(2) The area must be drained by a conveyance system comprised entirely of manufactured elements (*e.g.*, pipes, ditches, outfall protection) that extends to the ordinary high water line of the receiving water.

(3) Any erodible elements of this system must be adequately stabilized to prevent erosion.

(4) Surface water from the area must not be diverted from or increased to an existing wetland, stream or near-shore habitat sufficient to cause a significant adverse effect to wetland hydrology, soils or vegetation.

o. Site restoration. All streambanks, soils and vegetation within 150 feet of a stream, water body or wetland disturbed by the project are cleaned up and restored as follows.

i. Restoration goal. The goal of site restoration is renewal of habitat access, water quality, production of habitat elements (such as large woody debris), channel conditions, flows, watershed conditions and other ecosystem processes that form and maintain productive fish habitats.

ii. Streambank shaping. Damaged streambanks must be restored to a natural slope, pattern and profile suitable for establishment of permanent woody vegetation.

iii. Revegetation. Areas requiring revegetation must be replanted with a diverse assemblage of species that are native to the project area or region,

including grasses, forbs, shrubs and trees, as appropriate to the site conditions.

iv. Pesticides. No pesticide application is allowed, although mechanical or other methods may be used to control weeds and unwanted vegetation.

v. Fertilizer. No surface application of fertilizer may occur within 50-feet of any stream channel.

p. Long-term adverse effects. Long-term adverse effects will be avoided or offset after taking all appropriate steps to avoid or minimize short-term adverse effects.

i. Actions of concern. The following actions require compensation for long-term adverse effects.

(1) Construction of new impervious surfaces inside the riparian buffer area.[18]

(2) Other activities that prevent development of properly functioning condition of natural habitat processes.

ii. Design review. The FHWA must ensure review and approval of designs by environmental staff to avoid or offset long-term adverse effects by applying the following considerations.

(1) Use of an ecosystem approach

(2) Habitat requirements of the affected species

(3) Productive capacity of the proposed construction and compensation site(s)

(4) Timing of the construction and compensation actions

(5) Length of time necessary to achieve full functionality

(6) Likelihood of success

iii. Project evaluation. The FHWA must ensure evaluation of compensation project success using quantitative criteria established for the project.

2. To implement Reasonable and Prudent Measure #2 (monitoring), the FHWA shall:

a. Implementation monitoring. Ensure submittal of a monitoring report to the NOAA Fisheries within 120 days of project completion or by December 31st of the year of project completion describing the FHWA's success meeting permit conditions. The project level monitoring report will include the following information.

i. Project identification

[18] For purposes of this Opinion only, "riparian buffer area" means land: (1)Within 150-feet of any natural water occupied by listed salmonids during any part of the year or designated as critical habitat; (2) within 100-feet of any natural water within 1/4 mile upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat; and (3) within 50-feet of any natural water upstream of areas occupied by listed salmonids or designated as critical habitat and that is physically connected by an above-ground channel system such that water, sediment, or woody material delivered to such waters will eventually be delivered to water occupied by listed salmon or designated as critical habitat. "Natural water" means all perennial or seasonal waters except water conveyance systems that are artificially constructed and actively maintained for irrigation.

(1) Monitoring and reporting contact and project name.
(2) Brief description of activity
(3) Project location, including any compensatory mitigation site(s), by 5th field HUC and by latitude and longitude as determined from the appropriate USGS 7-minute quadrangle map
(4) FHWA contact person.
(5) Starting and ending dates for work completed

ii. Narrative assessment. A narrative assessment of the project's effects on natural stream function, including a description of the hydraulic conditions relative to fish passage such as water depth, velocities, and jump heights resulting from the culvert retrofit for fish passage.

iii. Photo documentation. Photo of habitat conditions at the project and any compensation site(s), before, during, and after project completion.[19]
(1) Include general views and close-ups showing details of the project and project area, including pre and post construction.
(2) Label each photo with date, time, project name, photographer's name, and a comment about the subject.

iv. Other data. Additional project-specific data, as appropriate for individual projects.
(1) Work cessation. Dates work cessation was required due to high flows.
(2) Fish screen. Compliance with NOAA Fisheries' fish screen criteria.
(3) A summary of pollution and erosion control inspections, including any erosion control failure, hazardous material spill, and correction effort.
(4) Site preparation.
(a) Total cleared area – riparian and upland.
(b) Total new impervious area.
(5) Isolation of in-water work area, capture and release.
(a) Supervisory fish biologist – name and address.
(b) Methods of work area isolation and take minimization.
(c) Stream conditions before, during and within one week after completion of work area isolation.
(d) Means of fish capture.
(e) Number of fish captured by species.
(f) Location and condition of all fish released.
(g) Any incidence of observed injury or mortality.
(6) Site restoration.
(a) Finished grade slopes and elevations.

[19] Relevant habitat conditions may include characteristics of channels, eroding and stable streambanks in the project area, riparian vegetation, water quality, flows at base, bankfull and over-bankfull stages, and other visually discernable environmental conditions at the project area, and upstream and downstream of the project.

(b) Log and rock structure elevations, orientation, and anchoring (if any).

(c) Planting composition and density. Differentiate between target composition and density at various intervals vs. initial planting composition and density if different.

(d) A five-year plan to:

(i) Inspect and, if necessary, replace failed plantings to achieve 80 percent survival at the end of the first year, and 80 percent survival or 80 percent coverage after five years (including both plantings and natural recruitment).

(ii) Control invasive non-native vegetation.

(iii) Protect plantings from wildlife damage and other harm.

(iv) Provide NOAA Fisheries annual progress reports.

(7) Long-term habitat loss. This will consist of the same elements as monitoring for site restoration.

b. Annual monitoring report. Provide NOAA Fisheries with an annual monitoring report by January 31 of each year that describes the FHWA's efforts carrying out this Opinion. The report will include the project level monitoring information with special attention to site restoration, fish passage and compensatory mitigation and reflect specific discussion on effectiveness of these measures to restore or enhance post-project conditions as compared to pre-project conditions. The report will also provide an overall assessment of project activity and cumulative effects. A copy of the annual report will be submitted to the Oregon Office of NOAA Fisheries.

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3. MAGNUSON-STEVENS ACT

3.1 Background

The objective of the essential fish habitat (EFH) consultation is to determine whether the proposed action may adversely affect designated EFH for relevant species, and to recommend conservation measures to avoid, minimize, or otherwise offset potential adverse effects to EFH resulting from the proposed action.

3.2 Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act (MSA), as amended by the Sustainable Fisheries Act of 1996 (Public Law 104-267), requires the inclusion of EFH descriptions in Federal fishery management plans. In addition, the MSA requires Federal agencies to consult with NOAA Fisheries on activities that may adversely affect EFH.

EFH means those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity (MSA §3). For the purpose of interpreting the definition of essential fish habitat: "Waters" include aquatic areas and their associated physical, chemical, and biological properties that are used by fish and may include aquatic areas historically used by fish where appropriate; "substrate" includes sediment, hard bottom, structures underlying the waters, and associated biological communities; "necessary" means the habitat required to support a sustainable fishery and the managed species' contribution to a healthy ecosystem; and "spawning, breeding, feeding, or growth to maturity" covers a species' full life cycle (50CFR600.110).

Section 305(b) of the MSA (16 U.S.C. 1855(b)) requires that:

- Federal agencies must consult with NOAA Fisheries on all actions, or proposed actions, authorized, funded, or undertaken by the agency, that may adversely affect EFH.

- NOAA Fisheries shall provide conservation recommendations for any Federal or state activity that may adversely affect EFH.

- Federal agencies shall within 30 days after receiving conservation recommendations from NOAA Fisheries provide a detailed response in writing to NOAA Fisheries regarding the conservation recommendations. The response shall include a description of measures proposed by the agency for avoiding, mitigating, or offsetting the impact of the activity on EFH. In the case of a response that is inconsistent with the conservation recommendations of NOAA Fisheries, the Federal agency shall explain its reasons for not following the recommendations.

The MSA requires consultation for all actions that may adversely affect EFH, and does not distinguish between actions within EFH and actions outside EFH. Any reasonable attempt to encourage the conservation of EFH must take into account actions that occur outside EFH, such as upstream and upslope activities, that may have an adverse effect on EFH. Therefore, EFH consultation with NOAA Fisheries is required by Federal agencies undertaking, permitting or funding activity that may adversely affect EFH, regardless of its location.

3.3 Identification of EFH

The Pacific Fisheries Management Council (PFMC) has designated EFH for three species of Pacific salmon: Chinook (*Oncorhynchus tshawytscha*), coho (*O. kisutch*), and Puget Sound pink

salmon (*O. gorbuscha*) (PFMC 1999). Freshwater EFH for Pacific salmon includes all those streams, lakes, ponds, wetlands, and other water bodies currently, or historically accessible to salmon in Washington, Oregon, Idaho, and California, except areas upstream of certain impassable man-made barriers (as identified by the PFMC), and longstanding, naturally-impassable barriers (*i.e.*, natural waterfalls in existence for several hundred years). Detailed descriptions and identifications of EFH for salmon are found in Appendix A to Amendment 14 to the Pacific Coast Salmon Plan (PFMC 1999). Assessment of potential adverse effects to these species' EFH from the proposed action is based on this information.

3.4 Proposed Actions

The proposed action is detailed above in section 1.2 of this document. For the purposes of this consultation, the action area is defined as the streambed, streambank and riparian corridor of Rock, Richardson, the unnamed tributary of Richardson, Noyer, and North Fork Deep Creeks extending to the upstream project disturbance limits and downstream one mile below the project disturbance limits. Other areas of the Clackamas River watershed will not be directly affected. This area has been designated as EFH for various life stages of chinook salmon and coho salmon.

3.5 Effects of Proposed Action

As described in detail in section 1.5 of this document, the proposed activities may result in short-term, temporary adverse effects, long-term adverse effects, and long-term beneficial effects to designated EFH.

3.6 Conclusion

The proposed action may adversely affect the EFH for chinook and coho salmon.

3.7 EFH Conservation Recommendations

Pursuant to section 305(b)(4)(A) of the Magnuson-Stevens Act, NOAA Fisheries is required to provide EFH conservation recommendations for any Federal or state agency action that would adversely affect EFH. The conservation measures proposed for the project by the FHWA, all of the Reasonable and Prudent Measures and the Terms and Conditions contained in sections 2.2 and 2.3 are applicable to salmon EFH. Therefore, NOAA Fisheries incorporates each of those measures here as EFH recommendations.

3.8 Statutory Response Requirement

Please note that the Magnuson-Stevens Act (section 305(b)) and 50 CFR 600.920(j) requires the Federal agency to provide a written response to NOAA Fisheries after receiving EFH conservation recommendations within 30 days of its receipt of this letter. This response must include a description of measures proposed by the agency to avoid, minimize, mitigate or offset

the adverse impacts of the activity on EFH. If the response is inconsistent with a conservation recommendation from NOAA Fisheries, the agency must explain its reasons for not following the recommendation.

3.9 Supplemental Consultation

The FHWA must reinitiate EFH consultation with NOAA Fisheries if either action is substantially revised or new information becomes available that affects the basis for NOAA Fisheries' EFH conservation recommendations (50 CFR 600.920).

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